The acquisition and processing of cognate words: On the neglected role of phonology

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“El director del museo dijo que la estatua del Ángel Caído está localizada exactamente a 666 metros sobre el nivel del mar”

“The director of the museum said the statue of the Fallen Angel is located at exactly 666 meters above the sea level”
Fig. 1. (a–d) Graphical illustration of four theoretical positions on cognate representation. Input is the Dutch word *tomaat*, meaning ‘tomato’ in English. Dutch is assumed to be L1 and English is L2. Panel a: shared morphological representation; panel b: associatively linked orthographic representations; panel c: orthographically linked representations and panels d: orthographically linked representations. ™ facilitates the generation of the figure and the text.
Vocabulary teaching strategies and conceptual representations of words in L2 in children: Evidence with novice learners

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ARTICLE INFO

Article history:
Received 30 May 2008
Revised 18 October 2008
Available online 11 December 2008

Keywords:
Semantic relationships
Bilingualism
Word recognition
Educational psychology
Memory Learning

ABSTRACT

A controversial issue in bilingual research is whether in the early stages of L2 learning, access to the conceptual system involves mediation of L1 lexical representations (Kroll, J. F., & Stewart, E. (1994). Category interference in translation and picture naming: Evidence for asymmetric connections between bilingual memory representations. Journal of Memory and Language, 33, 148-174) or a direct route from the L2 word (Atkinson, L., & Mathis, K. M. (1997). Conceptual and lexical development in second language acquisition. Journal of Memory and Language, 36, 550-568; Finek, M. and Language 383). The main question is whether the concept can be possible even further. Further evidence is needed to understand whether related pairs may interfere, and if so, how learning is a grounding of the interference effect - a grounding effect of evidence is examined.

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The interplay of phonology and orthography in visual cognate word recognition: An ERP study

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ARTICLE INFO

Article history:
Received 10 July 2012
Revised 31 August 2012
Accepted 3 September 2012

Keywords:
Cognate words
Phonological and orthographic overlap
Masking priming

ABSTRACT

This study examined the role of phonological and orthographic overlap in the recognition of cognate words by recording electrophysiological and behavioral data. One hundred and ninety-two words were selected: 96 cognate words listed according to their phonological and orthographic overlap, 96 non-cognate words. Twenty-four proficient European Portuguese-English bilinguals performed a silent reading task with a masked priming paradigm. The results showed that phonology interacts with semantic similarity at N400 modulation. Phonological priming effects were dependent on the orthographic overlap of cognate words. Thus, the distinctive processing of cognate words seems to be due to their cross-language similarity, which is consistent with a localist connectionist account of cognate representation and processing.

Lexical and semantic representations in the acquisition of L2 cognate and non-cognate words. Evidence from two learning methods in children

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How bilinguals represent words in two languages and which mechanisms are responsible for second language acquisition are important questions in the bilingual and vocabulary acquisition literature. This study aims to analyse the effect of two learning methods (picture vs. word-based method) and two types of words (cognates and non-cognates) in early stages of children's L2 acquisition. Eighteen native speakers of European Portuguese (mean age = 0.85, participated in the L2 in this study). After a picture- or a word-based on recognition task at two different tasks, the participants made decisions related tasks as to what the effect was
Revised Hierarchical Model (Kroll & Stewart, 1994)

Proficient bilinguals:

\[
\begin{align*}
& L_1 \quad \text{casa} \\
& \text{Conceptual System} \\
& Telhado, janelas, portas... \\
& L_2 \quad \text{house}
\end{align*}
\]
Backward translation recognition task

- Fixation point: 1000 ms
- Word in L2: 250 ms
- Casa
- Close-up: positiva
- Negativa
- Word in L1: 2500 ms or until participant's response
- House
- +
- Fixation point: 1000 ms
• more time is necessary to respond to, and
• more errors are committed rejecting words in the **Semantically related** condition than in the **Unrelated** condition

Semantic Interference Effect (SIE)
Experiment 1

Spanish children of 9/10 years old had to learn Basque noncognate words (L2) via two learning methods:

1) Learning phase

L2-L1 training method vs. L2-picture learning method

olagarroa = pulpo

2) Test phase: Backward translation recognition task immediately after learning and a week later
Size of SIE in Errors (left) and RTs (right)

Relatedness x Method: p< .05: the SIE was restricted to participants from L2-pictures group
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Children results

L2-L1 training method

L2-picture training method

Relatedness: p< .001:

Relatedness x Word type x Method (p= .07): the SIE was slightly greater for participants from L2-L1 group
Relatedness x Method: p< .05: the SIE was greater for participants from L2-pictures group, as in the first experiment with children who learned only noncognate words.
TO SUMMARIZE

• **CG words** are more easily acquired in comparison with NCG.

• **Stimuli list composition** affects the performance of the children beginners of L2. When the list only includes noncognate words, a method that uses pictures instead of equivalent translation proves more effective in the establishment and consolidation of direct semantic links from L2.

• When the list includes both noncognates and cognates, the advantage of this method is vanished, but only when the participants are children. If the participants are adults, the advantage of the L2-picture method remains.
WHICH are the implications of the present data for the Revised Hierarchical Model?

✓ Beginner L2 learners are able to encode conceptual information directly from L2, at least under certain circumstances.

✓ Stimuli list composition affect the performance of children but not of adults.

✓ Thus, the RHM and other models of bilingual memory should echo the presence of early links from L2 to the conceptual level as well as the differences in L2 word acquisition as a function of age.

✓ The acquisition of CG is more easily in comparison with the acquisition of NCG probably due to the high O overlap... **BUT we do not still know where the locus of the CG effect is...**
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How bilinguals represent words in the two languages and which mechanisms are responsible for second language acquisition are important questions in bilingualism and vocabulary acquisition literature. This study aims to analyse the effect of two learning methods (picture vs. word-based method) and two types of words (cognates and non-cognates) in early stages of children's L2 acquisition. Furthermore, native speakers of European S, participated in the study. After a pure word-based recognition task at two the participants made out unrelated words as well as of this effect was

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Article Info
Article history:
Received 10 May 2012
Revised 23 August 2012
Accepted 3 September 2012

Highlights
- We explored the interplay of phonology and orthography in cognate word recognition.
- The phonological and orthographic codes of cognates were orthographically manipulated.
- The results showed an early coactivation of sublexical codes during silent reading.
- Data sustained the local network theory of phonological word representations.

Abstract
This study examined the role of phonological and orthographic overlap in the recognition of cognate words by recording electrophysiological and behavioral data. One hundred and ninety-six cognate words were selected. Sixty on cognate words listed according to their phonological and orthographic overlap vs. 96 non-cognate words. Twenty-four proficient European Portuguese–English bilinguals performed a silent reading task with a masked priming paradigm. The results showed that phonology interacts with semantic activation at N400 modulations. Phonological priming effects were dependent on the orthographic overlap of cognate words. Thus, the distinctive processing of cognate words seems to be due to their cross-linguistic similarity, which is consistent with a local network account on cognate representation
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Received 20 July 2012
Revised in revised from 20 August 2012
Accepted 3 September 2012

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ABSTRACT
This study examined the role of phonological and orthographic overlap in the recognition of cognate words by recording electrophysiological and behavioral data. One hundred and ninety-two words were selected: 96 cognate words listed according to their phonological and orthographic overlap, 96 noncognate words. Twenty-four proficient European Portuguese–English bilinguals performed a silent reading task with a masked priming paradigm. The results showed that phonology interacts with semantic activation at N400 modulations. Phonological priming effects were dependent on the orthographic overlap of cognate words. Thus, the distinctive processing of cognate words seems to be due to their cross-linguistic similarity, which is consistent with a localist connectionist account on cognate representation and processing.
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>L2 Task</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schwartz et al. (2007).</td>
<td>English-Spanish bilinguals</td>
<td>Naming</td>
<td>✓ No differences between CG and NCG words</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ O+P+ &lt; O+P-</td>
</tr>
<tr>
<td>Dijkstra et al. (2010)</td>
<td>Dutch-English bilinguals</td>
<td>Lexical Decision (LDT)</td>
<td>✓ CG &lt; NCG (identical CG markedly faster)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ O+ &lt; O-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ P affected only Identical CG</td>
</tr>
<tr>
<td>Comesaña et al. (2012)</td>
<td>European Portuguese-English bilinguals</td>
<td>Masked priming silent reading task</td>
<td>✓ Non-identical CG &gt; NCG</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>✓ O-P+ &gt; O-P-</td>
</tr>
</tbody>
</table>
OBJECTIVES

To test if the presence of identical CG word in the list modulates the direction of the CG effects

✓ In the first experiment the experimental list contained identical and non-identical cognate words which orthogonally varied in the degree of O and P overlap (O+P+, O+P-, O-P+, O-P-) and matched noncognate words.

Hypothesis: CG<NCG; O+<O-; and P+<P- but only with identical, replicating the results of Dijkstra et al. 2010

✓ In the second experiment, only non-identical cognates and matched noncognate words made up the experimental list.

Hypothesis: CG>NCG, O-P+>O-P-

Comesaña et al. (under review). Facilitative effect of cognate words vanishes when reducing the orthographic overlap: Evidence from lexical decision. JEP: L, M, C
Method in both experiments

Procedure

Lexical Decision Task (LDT) in L2

- 500 msec
- TAREA
- Until response or after 2500 msec
- ISI = 1100 msec

Design

- Lexicality (word vs. nonword) x Word Status (CG vs. NCG) x O Overlap (O+ vs. O-) x P Overlap (P+ vs. P-)
Participants (20 Catalan-Spanish proficient bilinguals (L1 – L2). They completed an adaptation of the Language History Questionnaire (Li, Sepanski, & Zhao, 2006)

- Mean age = 22.5 years (SD = 2.3)
- Mean age of L2 acquisition = 1.9 (SD = 2.2)

Self-ratings (Mean and SD) of L2 proficiency based on a 7-point Likert scale (from 1-low to 7-high)

<table>
<thead>
<tr>
<th>Proficiency</th>
<th>Catalan (L1)</th>
<th>Spanish (L2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (SD)</td>
<td>6.9 (0.1)</td>
<td>6.7 (0.2)</td>
</tr>
<tr>
<td>% language usage</td>
<td>75%</td>
<td>25%</td>
</tr>
</tbody>
</table>

DMDX software (Forster & Forster, 2003)
Materials

• Targets
  • 192 Spanish words (96 cognates [48 identical + 48 non-identical] + 96 noncognates matched in frequency, length, bigram frequency and O and P neighborhood (all ts < 1.76)

• CG words were divided in 4 experimental conditions matched in frequency, bigram frequency, length, and O and P neighbors.

Means (SD) of the Phonological (P) and orthographic (O) overlap of CG words in 4 experimental conditions.

<table>
<thead>
<tr>
<th>O+P+</th>
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<th>O-P+</th>
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<tr>
<td>O overlap</td>
<td>1 (0.00)</td>
<td>1 (0.00)</td>
<td>0.70 (0.08)</td>
</tr>
<tr>
<td>P overlap</td>
<td>0.98 (0.1)</td>
<td>0.79 (0.04)</td>
<td>0.98 (0.00)</td>
</tr>
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</table>

plata-PLATA (silver)  jugador-JUGADOR (player)  llenya-LEÑA (wood)  cuina-COCINA (kitchen)
A facilitative effect of CG words: CG< NCG, $t_1(19) = 2.11, p < .05, t_2(190) = 1.23, p = .22$.

BUT, did this facilitative effect appear for both cognates?

✓21.5-ms facilitation effect for identical cognate words over noncognates (610.4 ms and 631.9 ms, respectively, $p < .05$)

✓but importantly not for non-identical cognate words (622.8 ms): a non-significant 9.1-ms effect

$F_1(2, 38) = 4.58, p < .05; \eta^2 = .20; \text{MSE} = 18275.88; F_2(2, 141) = 2.25, p = .11, \eta^2 = .03, \text{MSE} = 3169.45$
ANOVA considering only CG (identical and non-identical CG)

- An inhibitory effect of P overlap: \( P^+ > P^- \), \( F_{1}(1, 19) = 19.65, p < .001; \eta^2 = .51; F_{2}(1,188) = 1.48, p = .22 \).

In the ANOVA by errors:
- A facilitative effect of O overlap: \( O^+ < O^- \), \( F_{1}(1, 19) = 5.50, p < .05, \eta^2 = .22; F_{2}(1,188) = 0.96, p = 0.33 \).
Participants (23 Catalan-Spanish proficient bilinguals (L1 - L2). They completed an adaptation of the Language History Questionnaire (Li, Sepanski, & Zhao, 2006)

- Mean age = 21.8 years (SD = 2.6)
- Mean age of L2 acquisition = 2.7 (SD = 2.0)

- Self-ratings (Mean and SD) of L2 proficiency based on a 7-point Likert scale (from 1-low to 7-high)

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<td>O overlap</td>
<td>0.77 (0.03)</td>
<td>0.77 (0.03)</td>
<td>0.58 (0.09)</td>
<td>0.55 (0.07)</td>
</tr>
<tr>
<td>P overlap</td>
<td>0.89 (0.05)</td>
<td>0.74 (0.05)</td>
<td>0.88 (0.06)</td>
<td>0.72 (0.07)</td>
</tr>
</tbody>
</table>

brusa-BLUSA  atzar-AZAR  tasca-TAREA  conte-CUENTO
An inhibitory effect of CG words: CG > NCG, $t_1(22) = 4.17, p < .001, t_2(190) = 2.49, p < .05$

**BUT, did this facilitative effect appear for O+ and O- cognates?**

✓ The inhibitory effect of cognate words with respect to noncognates was significant for both Cognates O+ (20 msec., $p < .01$) and Cognates O- (34 msec., $p < .001$), although no differences between the groups were found

$F_1(2, 44) = 15.57, p < .001, \eta^2 = .41; \text{MSE} = 430.50, F_2(1, 141) = 4.02, p < .05, \eta^2 = .05, \text{MSE} = 3831.75.$
ANOVA considering only CG (non-identical CG)

- A facilitative effect of O overlap: $O^+<O^-$, $F_1(1, 22) = 13.20$, $p < .005$, $\eta^2 = .38$; $F_2(1,188) = 0.02$, $p = .89$.
- An interaction between O and P: $F_1(1, 22) = 13.20$, $p < .005$, $\eta^2 = .38$; $F_2(1,188) = 0.02$, $p = .89$. 
TO CONCLUDE

✓ The direction of CG effects depends not only on task requirements but also on stimuli list composition.

✓ The effect of P is more pervasive for CG with low O overlap.

✓ This is consistent with the idea that the effect of CG words is located at a lexical level (at least for non-identical CGs) as well as with the idea of a different representation for identical and non-identical CG words in the bilingual memory (Comesaña et al., 2012; Dijkstra et al. 2010; Peeters et al., 2013).
The research reported in this paper has been funded by the Spanish Ministry of Economy and Competitiveness (PSI2012-37623) as well as by FCT (Fundação para a Ciência e Tecnologia), and FEDER (Fundo Europeu de Desenvolvimento Regional) through the European programs QREN (Quadro de Referência Estratégico Nacional), and COMPETE (Programa Operacional Factores de Competitividade) (PTDC/PSI-PCO/104679/2008).